

SOLID STATE TECHNOLOGY

Ultrasonic Flow Meter Type ACP TK300



ACP TK300 device design

The flow meter ACP TK 300 uses ultrasonic technology to record the flow velocity and flow direction. One measuring unit consists of 2 transmitter and 1 receiver sensor.

The measurement is carried out selectively on the tunnel wall and remains unaffected by traffic and air turbulence, since only the flow in the longitudinal direction is detected and the signal is not interrupted, e.g. by stationary traffic. Thanks to the fixed arrangement, the geometry is clearly defined, which greatly simplifies assembly and commissioning.

The measuring head has no moving parts and has a degree of protection of IP 67. The measuring device requires only minimal annual maintenance.

The measuring heads are arranged on the side of the tunnel wall, whereby a measuring point consists of 2 measuring heads. The evaluation is carried out in a control unit CDU.

The measured value output can consist of either the 2 individual or an average value over the two measuring heads.

An averaging time can be set arbitrarily.



ACP TK 300 Ultrasonic Flow Meter for wind direction and speed composed of: 2 transmitters and 1 receiver Communication via RS 485 with CDU

CDU, Control Unit Connection of up to 2 measuring heads (1 pair=1 measuring point) 2 x 4-20mA outputs 8 x relay outputs, serial interface RS 485 or ProfiBus DP

ACP TK300 MEASURING SYSTEM



The transmitters (Tx1 and Tx2) alternately emit sound waves in the direction of the receiver (Rx),. In the example shown (flow from the right), the transit time of the sound waves on route B is accelerated and reduced accordingly on route A. The transit time difference ultimately results in the flow velocity and direction.

The measuring signals determined in this way are evaluated and processed into a measured value output in m/s.

An integrated temperature measurement also compensates for any temperature influences. This measurement can also be output as a measured value.

2 measuring heads each form a measuring point, using the arithmetic mean of the two individual values.



Measuring device with 2 measuring heads

ACP TK300 ASSEMBLY AND INSTALLATION

The measuring heads are mounted on the side of the tunnel wall at a height of 4 to 4.5m. Due to the design of the measuring heads, the geometry is clearly defined and thus no complex alignment or parameterization is necessary. The measuring heads are calibrated ex works in a wind tunnel and are ready for operation according to the motto "Connection-ready-free". With the help of ventilation tests and comparative measurements, any corrections, e.g. due to structural conditions, can be corrected directly on the measuring head.

The measuring heads are supplied with 1m cable, junction socket and plug connection and can therefore be dismantled quickly and easily, e.g. in the event of a failure or for tunnel cleaning.

A mounting bracket is included in the scope of delivery, so that the installation can be prepared in advance. In addition, this simplifies any disassembly or replacement.



Mounting height





Sizes





Mounting example

Maintenance

The wind measurement is carried out directly in the driving compartment. As a result, the measuring heads are exposed to increased contamination. In order to ensure correct functioning, these must be checked and cleaned at least 1x a year. Cleaning is mainly limited to the sounders. These can be rubbed off with a soft cloth and a detergent. Depending on the type of contamination, the use of an oxidation remover is also suitable.

The test of the measured values can be carried out e.g. with a portable anemometer or by covering the measuring head to generate a "zero flow". If deviations occur > 0.2m/s, they can be corrected directly via the RS232 interface on the measuring head.

Tunnel cleaning

The TK300 are designed in such a way that they can withstand the pressure of the washing brushes.

Advantages over Cross Wind Measure System

Point measurement offers some significant advantages over Cross measurement.

Failure of a measuring head:

Should a measured value fail during the arrangement with 2 measuring heads, the

2. Measured value available, as each measuring head is autonomous.

Interruption of the measuring section:

Wind measurement is of great importance, especially in the event of a fire. Since in such a case the traffic jams, there is the possibility that the measuring distance is interrupted by high vehicles in a cross-measurement. To prevent this, these devices are often mounted just below the ceiling, which can lead to distortions due to sound reflections on the ceiling. In addition, this can also lead to unrepresentative results, as the direct airflow of the jet fans has a stronger effect here. Assembly and installation:

The point measurement is easy to install and can also be replaced without much effort. The transverse measurement, on the other hand, must be aligned and precisely measured.

Specifications

Measuring Range	Settable up to 20 m/s
Measurement precision	+/-0,1 m/s
Linearity	< +/- 0.1%
Measuring frequency	40 kHz
Power Unit Supply	24VDC, Power consumption 10 VA max.
Temperature Compensation Ultrasonic	by means of PT100 -20 to +100°C
Work Temperature	-25 to +50°C
Communication	RS 485, Connection to CDU, RS 232 PC-Connection
Material	Anodized aluminum or stainless steel V4A 1.4404, degree of protection IP 67
Sizes	Ø 200 x 195 mm, ca. 3kg

CDU TK 400 control unit

Outputs	2 x 4-20mA max. 500 Ohm, 8 x relay contacts max. $50V/1A$, outputs can be configured as desired
Sizes	W x H x D, 110 x 110 x 70 mm, mounting on DIN rail 35mm or front frame installation
Power consumption	24 VDC, max. 10VA
Display	LCD-Display Touch-Panel
Connections	RS 232 port, for programming, RS 485 port for measuring heads, optional ProfiBus DP



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